

VII. *Notes on Hawaiian Wasps, with Descriptions of New Species.* By ROBERT CYRIL LAYTON PERKINS, B.A. Communicated by DR. DAVID SHARP, M.A., F.R.S.

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THE present paper deals only with the wasps which are found on the island of Hawaii, and the distinguishing characters of the many species are given in the table, which will enable the hymenopterist to readily separate the various forms. Only four or five of these species are found on any other island of the group, all the rest being peculiar to Hawaii. These species are more numerous and difficult than the Oahuan species, which I have previously tabulated (E. M. M., Vol. XII., 2nd Ser., p. 264), and consequently I have added sufficiently full descriptions of the new ones. Owing to the one sex (whether ♂ or ♀) frequently presenting striking characters not exhibited by the other, the table from 27 becomes double, the males being treated of from 27 to 59, the females from 60 to 92. Before 27 males and females are included under each head. In one or two cases I have included a species both under the ♂ and ♀, although the latter sex is not known to me, but in these cases the characters given are such as present no differences according to the sex. A little care is necessary in examining the emargination of the apex of the clypeus, as the depression behind it often makes it appear stronger than is really the case, and it should be noticed that strong cyanide is liable to turn the yellow markings red, especially the small frontal spot, the colour of which I have found it convenient to use in one case. I think it probable that the table includes nearly all the species that exist on Hawaii, and that very few more remain to be discovered.

TABLE OF SPECIES.

1. (2) Postscutellum with an elevated ridge ; second discoidal cell at the apex about twice as high as the third discoidal at its base. . . . . *O. nigripennis*, Holmgr.

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2. (1) Postscutellum without a transverse elevated ridge; second discoidal cell at the apex generally much less than twice as high as the third at its base.
3. (14) Costæ of second ventral segment wanting, or much effaced and indistinct; or extremely short, the middle ones not so long as the transverse basal portion of the segment, which is before them.
4. (9) Second ventral segment greatly raised behind the transverse sulcature, very much higher than its basal portion.
5. (6) ♂. Mandibles and apex of clypeus red; propodeum smooth and shining with a few punctures in front; abdomen deep-black, shining. . . . . *O. cypris*, sp. nov.
6. (5) ♂. Mandibles and apex of clypeus not red; propodeum dull, or with the concavity densely and largely punctate.
7. (8) Posterior concavity of the propodeum coarsely and closely punctured; mesothorax shining between the punctures.  
*O. entretus*, sp. nov.
8. (7) Posterior concavity of propodeum dull, with at most some feeble and indefinite punctures; mesothorax not shining.  
*O. heterochromus*, P.
9. (4) Second ventral segment little, or not at all, raised behind the costæ, or transverse sulcature.
10. (11) Front of head and mesothorax very dull, with the puncturation nearly effaced, hardly visible.  
*O. egeus*, P. (! var. = *O. infaustus*, P.).
11. (10) Mesothorax dull with distinct punctures, or shining and coarsely punctured.
12. (13) Mesothorax dull, finely punctured, abdomen often red-marked above or beneath. . . . . *O. cyanopteryx*, P.
13. (12) Mesothorax coarsely and closely punctured, shining between the punctures; abdomen entirely black.  
*O. holomelas*, sp. nov.
14. (3) Costæ of second ventral segment always distinct, and never very short, the middle ones about as long or sometimes longer than the basal portion of the segment.
15. (26) First and second abdominal segments above red, or one or both spotted with red at the sides, the red colour sometimes dull and not obvious at a glance, the spots of second segment sometimes confined to the deflexed sides and hardly visible in dorsal view.
16. (17) First and second abdominal segments nearly wholly red. wings with only a slight blue iridescence.  
*O. frater*, D. T.
17. (16) First and second segments only spotted with red; if

largely red then the wings have very conspicuous blue iridescence.

18. (19) ♂. Clypeus very deeply emarginate; sides of first and second segments obscurely red; mesothorax very dull, with very feeble or obsolete punctures; a median yellow spot behind the antennæ. . . . . *O. axestes*, P.

19. (18) ♂. Clypeus not very deeply emarginate; if deeply then the mesothorax is strongly and densely punctate.

20. (21) Depression of second ventral segment deep, very wide, impressed to the level of the costæ very widely at the base; front of head dull with fine, often nearly obsolete, punctures; second dorsal segment simple, when seen in profile not raised into a distinct hump at its basal third.

*O. obscure-punctatus*, Blackb.

21. (20) Depression of second ventral segment not extremely wide, nor widely sunk at the base to the level of the apices of the costæ; front of head densely punctured or somewhat shining, or the second dorsal segment of abdomen is rather strongly raised to a point at its basal third.

22. (23) ♂. Apex of clypeus very distinctly dentately-emarginate; mandibles red; propodeum rugose.

*O. dyserythrius*, P. var.

23. (22) ♂. Apex of clypeus sometimes depressed and dentate, but only slightly emarginate or truncate; mandibles red or dark; propodeum not rugose, sometimes a little roughened by some large, feebly-impressed punctures.

24. (25) Propodeum with some more or less evident, large shallow punctures; basal abdominal segment in strict lateral view very abrupt in front, so that its two faces meet at an angle (rounded off). . . . *O. rubopustulatus*, Blackb.

25. (24) Propodeum dull, but smooth, not punctured; lateral outline of basal abdominal segment forming an almost even but strong curve from the petiole.

*O. crypterythrus*, sp. nov.

26. (15) Basal segments of abdomen not red above, nor spotted with red at the sides, at most with the apical margin of the basal segment narrowly red.

27. (60) *Males*. Antennæ 13-jointed, terminal ones modified to form a hook.

28. (29) Second ventral segment largely or entirely red.

*O. dyserythrius*, P.

29. (28) Second ventral segment not red.

30. (39) Clypeus extremely deeply emarginate, the emargination almost semicircular or even deeper.

31. (32) Second segment beneath largely but lightly impressed behind the costæ ; above, greatly raised into a conical tuberculate form. . . . . *O. dromedarius*, Blackb.
32. (31) Second segment beneath with a distinct wide depression, very deep at its base, *or else* it is hardly more than simply convex above, not raised into a conical or tuberculate form.
33. (34) Second segment beneath with the depression very deep at the base, above subtuberculately elevated ; abdomen entirely black . . . . . *O. melanognathus*, P.
34. (33) Second segment beneath with a shallow or moderate depression ; above simply convex, not tuberculately elevated ; abdomen often yellow-banded or densely clothed with decumbent grey pubescence.
35. (36) Clypeus with one or two yellow spots (sometimes very small) ; depression of second ventral segment extremely shallow, sometimes hardly perceptible.  
*O. newelli*, sp. nov.
36. (35) Clypeus without yellow spots ; depression of second ventral segment distinct, moderate.
37. (38) Mesothorax and scutellum with appressed sericeous pubescence, so dense as to nearly conceal the surface, impunctate or very obscurely punctured.  
*O. sociabilis*, P.
38. (37) Mesothorax less densely clothed and more strongly punctured, the scutellum with sparse and feeble, but evident, punctures. . . . . *O. scoriaceus*, P.
39. (30) Clypeus truncate or somewhat emarginate at apex, never very deeply so, often impressed at apex behind the emargination, which gives it an appearance of being deeper than is really the case.
40. (41) Abdomen with two yellow bands *and* the second ventral segment flat behind the costæ without a depression.  
*O. cooki*, P.
41. (40) Abdomen sometimes with one, very rarely with two, yellow bands ; if yellow-banded there is a distinct depression behind the costæ.
42. (43) Mesothorax very densely rugulosely punctured, the punctures not coarse nor deep, running into one another ; (propodeum dull and smooth, at most a little rugose or with some obscure punctures ; mandibles dark).  
*O. venator*, P.
43. (42) Mesothorax not very densely rugulosely punctured (propodeum in some species conspicuously rugose and in some the mandibles are red).

44. (47). Second ventral segment with a large depression, deep in front, and extending back to or behind the middle of the part of the segment behind the costæ ; propodeum at the most slightly punctured or roughened, the posterior concavity dull but smooth, and without distinct sculpture ; mandibles red.
45. (46) Mesothorax extremely dull with the punctures extremely feeble or obsolete ; apex of clypeus not deeply impressed behind the emargination. . . . *O. erythrognaethus*, P.
46. (45) Mesothorax not strongly but distinctly punctured ; apex of clypeus deeply impressed behind the emargination.  
*O. orbis*, P.
47. (44) Depression of second ventral segment sometimes wide and well-marked (but much less deep than that of the two preceding species), in which case the propodeum is rugose ; if the propodeum is smooth, the depression of second ventral segment is somewhat small and narrow, not reaching to the middle of the part of the segment behind the costæ ; in some species the depression is very shallow, and hardly or not perceptible ; mandibles dark in nearly all the species.
48. (49) A median spot behind the antennæ, and some thoracic markings as well as the hind margin of basal abdominal segment red. (Probably all except the median frontal spot sometimes wanting). . . . *O. mesospilus*, sp. nov.
49. (48) Head, thorax and abdomen not red-spotted. Sometimes a yellow or yellowish median frontal spot.
50. (55) Second dorsal segment more or less strongly raised from the base, not simply convex.
51. (52) Puncturation of mesothorax very fine and feeble, sometimes obliterated. . . . . *O. cyphotes*, P.
52. (51) Puncturation of mesothorax very distinct.
53. (54) Mesothorax very dull between the punctures.  
*O. vulcanus*, Blackb.
54. (53) Mesothorax more or less shining between the punctures.  
*O. hiloensis*, P., and *komanus*, P.
55. (50) Second dorsal segment simply convex.
56. (57) Second ventral segment with the depression shallow, but quite distinct ; (thorax extremely dull, appearing greyish from dense, very short, erect grey hairs ; puncturation very feeble or obsolete). . . . . *O. peles*, P.
57. (56) Second ventral segment with the depression excessively shallow, or obsolete ; mesothorax more or less distinctly punctured.

58. (59) Clypeus much produced, elongate; no yellow spot behind the antennæ; inter-antennal carina extremely sharp.

*Chelodynerus chelifer*, P.

59. (58) Clypeus wide, not much produced; a yellow spot between the antennæ; the inter-antennal carina less sharp.

*Pseudopterocheilus pterocheiloides*, P.

60. (27) *Females*. Antennæ 12-jointed, the apical joints simple.

61. (62) Maxillary palpi extremely long, regularly fringed with long hairs. . . . *Pseudopterocheilus pterocheiloides*, P.

62. (61) Maxillary palpi normal.

63. (64) Mandibles extremely long and narrow, teeth obsolete or subobsolete, a distinct longish cheek between mandible and eye. . . . *Chelodynerus* (gen. nov.) *chelifer*, P.

64. (63) Mandibles normal; cheeks obsolete.

65. (84) Second dorsal segment of abdomen in profile distinctly raised from the base or very strongly convex, often tuberculate or subtuberculate in dorsal aspect; if hardly tuberculate, but very strongly convex in profile, then *either* the mesothorax is shining between the punctures, *or* the depression of the second ventral segment is very wide and deep, and the segment prominent, and almost tuberculate on either side of the depression at its base.

66. (67) Mesothorax with extremely dense (shallow and not coarse) rugulose puncturation. . . . . *O. venator*, P.

67. (66) Mesothorax not so punctured.

68. (69) Second ventral segment with a very shallow large impression behind the costæ; propodeum smooth.

*O. dromedarius*, Blackb.

69. (68) Second ventral segment with a large deep depression, *or* it is small, triangular, not extending half-way from the costæ to the apex (*O. cyphotes*), *or* the propodeum is rugose.

70. (71) A median *red* spot behind the antennæ (postscutellum and mesopleura sometimes also red-spotted, mesothorax deeply punctured, not dull, minute interstitial punctures very distinct, propodeum rugose). *O. mesospilus*, sp. nov.

71. (70) A yellow or yellowish spot behind the antennæ, or none.

72. (75) Mandibles red.

73. (74) Head normal; mesothorax with the larger punctures very fine and feeble, sparse; sometimes impunctate or nearly.

*O. erythrognathus*, P.

74. (73) Head incrassate; mesothorax distinctly, but not coarsely, punctured. . . . . *O. orbis*, P.

75. (72) Mandibles dark, at most reddish at the apex.

76. (81) Mesothorax very dull.
77. (78) Mesothorax distinctly and rather strongly punctured ; propodeum conspicuously rugose, even in the posterior concavity. . . . . *O. vulcanus*, Blackb.
78. (77) Mesothorax at the most finely and very feebly punctured ; propodeum at most a little roughened, or with some very feebly impressed coarse punctures, making it subrugose.
79. (80) Second ventral segment with a small depression, only distinct for a short way behind the costæ. *O. cyphotes*, P.
80. (79) Second ventral segment with a large, wide, deep depression, extending more than half-way from the costæ to apex of the segment. . . . . *O. melanognathus*, P.
81. (76) Mesothorax more or less shining between the punctures, never dull.
82. (83) Depression of second ventral segment wide. *O. konanus*, P.
83. (82) Depression of second ventral segment not very wide.  
*O. hiloensis*, P.
84. (65) Second dorsal segment simple, only ordinarily convex in profile ; mesothorax not shining ; depression of second ventral segment only moderately deep at base or sometimes very shallow.
85. (86) Minute interstitial punctures of mesothorax under a very strong lens present, but very feeble and not dense, inconspicuous owing to the microscopic surface sculpture ; apex of clypeus very slightly emarginate or truncate.  
*O. peles*, P.
86. (85) Minute interstitial punctures of mesothorax very dense ; apex of clypeus often rather strongly emarginate.
87. (90) Depression of second ventral segment very feeble or entirely wanting, wings not very dark and with little or no blue iridescence.
88. (89) Depression of second ventral segment feeble but present.  
*O. newelli*, sp. nov.
89. (88) Depression of second ventral segment wanting, surface flat beyond costæ, the basal part of the segment consequently appearing tumid. . . . . *O. cooki*, P.
90. (87) Depression of second ventral segment quite distinct, wings dark with blue or steely iridescence.
91. (92) Front of head finely and very feebly punctured.  
*O. sociabilis*, P.
92. (91) Front of head densely and distinctly punctured.  
*O. scoriaceus*, P.



*Odynerus cypri*, sp. nov.

Niger, mandibulis clypeiue apice rufis, abdominis segmento primo postice flavomarginato (an semper?). Frons capitis dense punctata, clypeo distincte emarginato. Mesonotum sparsim punctatum, interstitiis etiam distincte punctulatis. Propodeum læve, nitidum, parce punctatum. Abdominis segmentum secundum supra fere æqualiter convexum; subtus, post sulcum transversum fortiter abrupte elevatum, costis nullis, sulco nitido, depressione post sulcum angustissima. Alæ fuscae, nitentes, violaceo-iridescentes. ♂. Long. ad. apicem abd. seg. 2<sup>di</sup>. 8 m.m.

*Hab.* Puna, HAWAII.

*Odynerus cutretus*, sp. nov.

Niger, mandibulis ex majore parte vel totis nigris, fronte media post antenas sæpe rubronotata; alis infuscat, cæruleo-iridescentibus. Frons capitis densissime punctata, apice clypei subimpresso, truncato aut vix emarginato. Mesonotum nitidum, fortiter dense punctatum, propodeo lævi, postice dense punctato. Abdominis segmentum 2 dorsale simpliciter convexum, haudquaquam elevatum; ventrale post sulcum transversum fortissime abrupte elevatum, sulco nitido. ♂ ♀. Long. 7-10 m.m.

Sp. *O. heterochromo*, affinis, thorace nitido, multo grossius punctato, et sulco transverso segmenti ventralis 2<sup>i</sup> nitido distinctissima.

*Hab.* HAWAII, in several districts.

*Odynerus holomelas*, sp. n.

Niger, mandibulis rufis, alis infuscat, cæruleo-iridescentibus. Frons capitis densissime punctata, clypei apice plus minusve impresso, levissime emarginato aut truncato. Mesonotum grossius dense punctatum, haud opacum, propodeo postice grosse punctato. Abdominis segmentum 2 ventrale post costas haudquaquam elevatum, costis ipsis brevissimis, depressione post costas nulla. ♂ ♀. Long. 6-10 m.m.

Sp. huic affinis est *O. cyanopteryx*, Perk., qui thorace per paco, multo subtilius punctato, et abdomine sæpius aut supra ant infra rufonotato, conspiciendi differt.

*Hab.* Widely distributed on HAWAII, but not generally common.



*Odynerus crypterythrus*, sp. n.

Niger, mandibulis et nonnunquam apice clypei rufis; abdominis segmenti primi et secundi lateribus vel secundo solo rufonotatis. Caput et pronotum opacum, illo minus dense subtilius irregulariter punctato, propodeo laevi, haud nitido, impunctato. Abdominis segmentum a basi distincte subtuberculatum elevatum; subtus, depressione distincta, costis sat longis. Alae infuscae, caeruleo-iridescentes. ♂ ♀. Long. 7-9 m.m.

Sp. *O. obscure-punctato*, et *O. rubropustulato*, similis et affinis, ab hoc differt mesonoto multo subtilius punctato et propodeo haudquaquam punctato; ab illo depressione segmenti 2 ventralis minus lata, costarum apices ab basin multo minus late attingente.

*Hab.* Found on both sides of HAWAII, but probably much scarcer than the allied species.

*Obs.* This species further differs notably from the allied species, in the form of the basal abdominal segment. In these the front face or basal part is extremely abrupt, and in profile its outline forms an angle (rounded off) with the dorsal face. In the present species the lateral outline is a strong, but almost even curve from the petiole to the apex.

*Odynerus newelli*, sp. nov.

Niger, clypeo flavonotato, abdominis segmentis 2 basalibus postice flavomarginatis, alis haud aut vix evidenter caeruleo-iridescentibus. Clypeus profunde emarginatus, capitis fronte subtiliter, remotius et plus minusve obsoletim punctata. Mesonotum opacum distincte sat dense nec grosse punctatum, propodeo rugoso vel subrugoso. Abdominis segmentum 2 dorsale haudquaquam elevatum; ventrale post costas depressione levissima, nonnunquam vix discernenda, signatum. ♂. Long. 7-10.

Sp. *O. smithii*, D.T., cognatissima, capitis fronte subtilius, obsoletius et remotius punctata distinguenda.

*Hab.* Hiio, HAWAII, on the coast and also on the Kona coast.

The ♀ will no doubt differ by its black clypeus, less deeply emarginate, and the less distinct abdominal bands, probably one or both being generally wanting. This species was discovered by Bro. Matthias Newell.

*Odynerus mesospilus*, sp. nov.

Niger, fronte inter antennis rufonotata. Pronotum ♂ et abdominis segmentum basale, mesopleura utriusque sexus, et post-scutellum ♀, nonnunquam rufonotata, sed variabilia. Clypeus levissime emarginatus vel truncatus, capitis fronte densissime sub-rugosa punctata. Mesonotum fortiter punctatum, interstitiis nitidis et distinctissime punctulatis, propodeo rugoso. Abdominis segmentum 2 dorsale fortissime (præcipue ♂) tuberculato-elevatum; ventrale post costas depressione sat lata et distincta, sed parum alta, signatum. ♂ ♀. Long. 8-10 m.m.

Sp. *O. erythrostactes*, qui insulam Maui incolit, affinis.

*Hab.* Puna, HAWAII.